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SEPARATION TYPE LIQUID DETERGENT COMPOSITION

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[Attached amendments have been incorporated into the text of this translation]

Claims

1. A two-phase separation type liquid detergent composition containing (A) at least one type of softener selected from among anionic surfactants and nonionic surfactants and (B) a carboxyl compound.

2. The composition described in Claim 1 of the invention in which the carboxyl compound is at least one type selected from among water-soluble polymer compounds containing an organic carboxylic acid, amino carboxylic acid, or a carboxyl group and salts thereof.

3. The composition described in Claim 1 or 2 in which the concentrations of the surfactant and carboxyl compound are in the range of 10 to 50 wt% and 2 to 30 wt%, respectively, based on the weight of the detergent composition.

Detailed explanation of the invention

Industrial application field

The present invention pertains to a two-layer separation type liquid detergent composition, and the invention further pertains to a liquid detergent composition having excellent detergency and excellent storage stability, which separates into two layers consisting of a layer mainly comprising a surfactant and a layer mainly comprising a compound containing a carboxyl group when left in a standing state.

Prior art

In the past, so-called separation type, where the composition separates into two layers and the components do not mix while standing, has been developed for hair shampoos and cosmetic materials so as to increase the storage stability of the effective ingredients. For example, methods where oily materials, for example, a higher alcohol ester of 2-ethyl hexyl acid (Japanese Kokoku Patent No. Sho 51[1976]-183), olive oil or squalane (Japanese Kokai Patent Application No. Sho 48[1973]-58007 and Japanese Kokai Patent Application No. Sho 48[1973]-103609), animal or vegetable oils or paraffins such as liquid paraffin and almond oil (Japanese Kokai Patent Application No. Sho 54[1979]-25906) are separated and the storage stability of the components is increased are disclosed. Gentle shaking is performed for the above-mentioned separation type compositions before use and the two layers are mixed and used.

However, a composition with increased storage stability of components upon separating into two layers and having excellent detergency has not been known among detergent compositions used for washing clothes or used in the kitchen. The above-mentioned compositions containing oily materials and anionic or nonionic surfactants are separated into two

layers and the aforementioned oily materials provide an oily component required for hair and skin when used as hair shampoos and cosmetic materials and enhance luster and a wet look, but become a kind of soiling in detergents used for clothing and in the kitchen; thus, it is not possible to use the composition in the same manner.

Problem to be solved by the invention

Based on the above background and as a result of much research conducted by the present inventors in an effort to produce a liquid detergent composition having excellent detergency and that clearly separates into two layers so as to enhance the storage stability of the components, the present invention was accomplished.

Means to solve the problem

In other words, the present invention is a two-phase separation type liquid detergent composition containing (A) at least one type of softener selected from among anionic surfactants and nonionic surfactants and (B) a carboxyl compound.

In the detergent composition of the present invention, the surfactant used as component (A) is an anionic surfactant or a nonionic surfactant, and for examples of anionic surfactants, standard sulfonate type, sulfate type and phosphate type anionic surfactants are used. Among the above-mentioned anionic surfactants, as examples of sulfonate type anionic surfactants, straight-chain or branched-chain alkyl (C_8 to C_{23})* benzene sulfonate, long-chain alkyl (C_8 to C_{22}) sulfate, long-chain olefin (C_8 to C_{22}) sulfate, etc. can be mentioned. Furthermore, for examples of sulfate type anionic surfactants, long-chain monoalkyl (C_8 to C_{22}) sulfate, polyoxyethylene (1-6 mol) long-chain alkyl (C_8 to C_{22}), polyoxyethylene (1-6 mol) alkyl (C_8 to C_{18}) phenyl ether sulfate, etc. can be mentioned, and for phosphate type anionic surfactants, for example, long-chain monoalkyl, dialkyl or sesquialkyl (8 to 22 carbon atoms in each alkyl group) phosphate, polyoxyethylene (1-6 mol) monoalkyl, dialkyl or sesqui(alkyl groups with 8 to 22 carbon atoms in each case) phosphate, etc. can be mentioned. For the cation used as counter ion of the above-mentioned anionic surfactants, alkali or alkaline earth metal ions such as sodium, potassium and magnesium, alkanolamine ions such as monoethanolamine, diethanolamine and triethanolamine, etc. can be mentioned.

For examples of nonionic surfactants, oxyalkylene adduct compounds such as polyoxyethylene (1-20 mol) long-chain alkyl (primary or secondary C_8 to C_{22}) ether, polyoxyethylene (1-20 mol) alkyl(C_8 to C_{18})phenyl ether, polyoxyethylene polyoxypropylene

* [Due to the nature of the foreign document, best guesses have been made for subscripts.]

block copolymer, and polyoxyethylene higher fatty acid ester, higher fatty acid alkanol amide or its alkylene oxide adduct, long-chain tertiary amine oxide (C₁₂₋₁₄), etc. can be mentioned.

The above-mentioned surfactants may be used independently or as a combination of two or more. An especially desirable mixing ratio is in the range of 10 to 50 wt%, especially, 20 to 30 wt%, of the base weight of the detergent composition.

For the carboxyl compound used as component (B) in the composition of the present invention, organic carboxylic acids and salts thereof, amino carboxylic acids and salts thereof, water-soluble polymer compounds made of polymerized monomers having a carboxyl group such as acrylic acid and salts of the same, etc. can be mentioned. For organic carboxylic acids and salts thereof, for example, polyhydric carboxylic acids such as malonic acid, succinic acid, fumaric acid, itaconic acid and adipic acid, hydroxy carboxylic acids and hydroxy polyhydric carboxylic acids such as malic acid, tartaric acid, citric acid and α -oxyglutaric acid, and salts thereof can be mentioned. For amino carboxylic acids and salts thereof, for example, aliphatic or aromatic amino acids such as glycine, leucine, serine, aspartic acid, glutamic acid, glutamine, cysteine, lysine and tyrosine, and salts thereof, and ethylenediaminetetraacetic acid, and nitrilotriacetic acid and salts thereof, etc. can be mentioned. Furthermore, for water-soluble polymer compounds and salts thereof, for example, polymers of acrylic acid and hydroxyacrylic acid and salts thereof can be mentioned.

The above-mentioned compounds may be used independently or two or more different types may be mixed and used in combination as well. A suitable mixing ratio of the compound is in the range of 2 to 30 wt% of the detergent composition weight.

An especially desirable above-mentioned compound having a carboxyl group is one type or a mixture of two or more types of organic carboxylic acids, amino carboxylic acids, water-soluble polymer compounds and salts thereof having at least 1 amino group or at least two hydroxyl groups and at least 2 carbon atoms when the number of carboxyl groups is one, and at least 3 carbon atoms when the number of carboxyl groups is two or more.

Furthermore, in addition to the above-mentioned essential ingredients, optional hydrotropes, cationic surfactants, amphoteric surfactants for enhancement of viscosity, stability, performance, product value, etc., colorants for tinting of the upper layer or lower layer, fragrances, etc. may be further included in the detergent composition of the present invention.

Effect of the invention

The two-layer separation type liquid detergent composition of the present invention exhibits excellent detergency and clear separation into two layers while standing, and has excellent storage stability of the components as well.

Application examples

The present invention will be further explained in detail with application examples below.

In this case, evaluation of the performance of compositions was done as shown below.

(1) Separation performance

A thorough mixing was performed for the composition at a temperature of 25 to 30°C and the result set standing, and separation into two layers was visually examined according to the criterion below.

O: Clear separation of upper layer and lower layer observed

Δ: Separated into upper layer and lower layer, but transparency is low.

x: Separated into upper layer and lower layer, but is turbid, or separation is not achieved

(2) Mixing performance

100 mL of the composition was measured into a glass bottle with 120 mL capacity, and left standing for 24 h, then, the condition after tumbling 10 times was visually examined according to the criterion below.

O: Uniform milky solution produced.

x: Uniform milky solution is not produced.

(3) Storage stability

100 mL of the composition was measured into a glass bottle with 120 mL capacity, and left standing at 25°C for 12 h, and a process where freezing (-10°C, 12 h) was performed and then restored (5°C, 12 h) was defined as 1 cycle, and 8 cycles were repeated, and the condition at 5°C was visually examined according to the criterion below.

O: Both upper and lower layers are clear

x: Either upper or lower layer is opaque or deposition is observed.

Application examples and comparative examples

Production of liquid detergent compositions with compositions shown in the table below was carried out, and evaluations was made for the separation performance, mixing performance, and storage stability. The results obtained are shown in the table below.

In the table shown below,

Nonion (A): Polyoxyethylene alkyl ether (R=C₁₂₋₁₃, EO_p=15, linearity 80%)

Nonion (B): Polyoxyethylene alkyl ether (R=C₁₃, EO_p=12, linearity 40%)

Nonion (C): Coconut fatty acid diethanol amide

Nonion (D): Monododecyl dimethylamine oxide

Nonion (A): Linear alkyl benzene sodium sulfonate ($R=C_{12}$)

Nonion (B): Polyoxyethylene alkyl ether sodium sulfate ($R=C_{12-13}$, $EOp=3$)

Cation (A): Monoalkyltrimethylammonium chloride ($R=C_{16-18}$)

Cation (B): Dialkyldimethylammonium chloride ($R=C_{16-18}$)

		① 例														② 実 施 例										③ 比 較 例									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	15	16	17	18	19	20	21	22	23	24
④ 洗 滌 剤	⑤ ニオン(A)	10	50	20	20	10		25	25	25	25	25	25			20	20	20	20	20	20		5	60											
	⑥ ニオン(B)					10	20															10	20												
	⑦ ニオン(C)				4									10																					
	⑧ ニオン(D)							2	2	2	2	2	2																						
④ 洗 滌 剤	⑨ ニオン(A)			4	4	2									15	4	4	4	4	4	4	20													
	⑩ アニオン(B)				4									20	15																				
④ 洗 滌 剤	⑪ カチオン(A)			4	4											4	4	4	4	4	4														
	⑫ カチオン(B)							4	4	4	4	4	4																						
成 物	⑬ シュウ酸ソーダ ⑬																					20													
	⑭ マロン酸ソーダ ⑭	30																																	
	⑮ アジピン酸ソーダ ⑮							10																											
	⑯ リンゴ酸ソーダ ⑯								10																										
の 成 分	⑰ 酒石酸ソーダ ⑰									10																									
	⑱ クエン酸ソーダ ⑱			7		3									5	5						1	10	40	20										
	⑲ グリシン ⑲										10																								
	⑳ グルタミン酸ソーダ ⑳											10																							
組 成 (重量%)	㉑ EDTAソーダ ㉑				2																														
	㉒ NTAソーダ ㉒						3								5	5																			
	㉓ ポリアクリル酸ソーダ ㉓	2				2																													
	㉔ デルコン酸ソーダ ㉔												10																						
成 分 (重量%)	㉕ カブロン酸ソーダ ㉕																				20														
	㉖ 乳酸ソーダ ㉖																																		
	㉗ 酢酸ソーダ ㉗																																		
	㉘ 塩化ナトリウム ㉘																																		
④ 洗 滌 剤	㉙ 硫酸ナトリウム ㉙																																		
	㉚ エタノール ㉚															4																			
	㉛ 水 ㉛	2	8	3	2	8	4	5	5	5	5	5	5	7	7	4	4	4	4	4	4	6	0	4	5										
	㉜																																		
④ 洗 滌 剤	㉝ 分離性 ㉝	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	×	×	×	△	×	×	△	△										
	㉞ 混合性 ㉞	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	×	×	×	×	○	×	×	×	×										
	㉟ 安定性 ㉟	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	×	×	×	×	×	×	×	×	×										

- Key:
- Examples
 - Application examples
 - Comparative examples
 - Composition of components of liquid detergent composition (wt%)
 - Nonion ()
 - Anion ()
 - Cation ()
 - Sodium oxalate
 - Sodium malonate
 - Sodium adipate

11	Sodium malate
12	Sodium tartarate
13	Sodium citrate
14	Glycine
15	Sodium glutamate
16	EDTA soda
17	NTA soda
18	Sodium polyacrylate
19	Sodium gluconate
20	Sodium caproate
21	Sodium lactate
22	Sodium acetate
23	Sodium chloride
24	Sodium sulfate
25	Ethanol
26	Water
27	Balance
28	Evaluation
29	Separation performance
30	Mixing performance
31	Stability